**Unit 12 Tutorials**

**Part 1 – WAS**

1. W = Wants (add them up)
   1. All Elements want 8 except Hydrogen which wants 2
   2. Example NH3 
      1. Nitrogen wants 8 + each Hydrogen wants 2
      2. 8+2+2+2=14
   3. Example NBr3
      1. Nitrogen wants 8 + each Bromine wants 8
      2. 8+8+8+8=32
2. A = Available (add them up)
   1. Determine the same way as you determined dots for the Lewis dot diagram
      1. Groups 1A-8A have the following available electrons
         1. (1,2 (skip the middle), 3, 4, 5, 6, 7, 8)
      2. Example NH3
         1. N has 5 available + each H has 1 available
         2. 5+1+1+1=8
   2. If the molecule has a charge, do the opposite to the A (see example)
      1. Example NH4+1
         1. +1 charge, so subtract one from the A
3. S = Subtract (W-A)
   1. Example NH3
   2. See above for W & A; 14 - 8 = 6
4. # of bonds (S/2)
   1. Example NH3
   2. See above for S; 6 / 2 = 3
   3. Sometimes this number doesn’t make sense so we have to do the VSEPR Method to see how it looks

**Take Unit 12 Test Part One on a separate piece of paper**

**Part 2 – VSEPR Method**

1. EP = A/2
   1. Example BrF3
      1. A = 7 + 7 + 7 + 7 = 28
      2. EP = 28 / 2 = 14
2. BP = # of atoms -1
   1. Example BrF3
   2. ­This molecule has 1 Bromine and 3 Fluorines. That’s 4 atoms
   3. 4 – 1 = 3
3. CP = EP – (3xBP)
   1. If you have hydrogen in the molecule
      1. Subtract 1 from the BP for each hydrogen before you plug it in
   2. Example BrF­­3
      1. CP = 14 – (3 x 3) = 5
4. LP = CP – BP
   1. Example BrF3
      1. LP = 5 – 3 = 2
5. Drawing the picture
   1. Use the chart from your packet.
   2. Look up the picture that is to the right of your CP and LP on the chart
   3. Draw it like you see it, but change the E & X to the symbols for your elements
   4. Put dots around the outer elements to satisfy them (get them to 8) Unless it is Hydrogen (because the bond is enough for it)

**Take Unit 12 Test Part Two on a separate piece of paper**

**Part 3 – Covalent Compounds**

1. What to know
   1. A Covalent Compound is a combination of two non metals (right side of the periodic table + Hydrogen)
2. Naming Rules
   1. Use the Latin prefixes to identify how many of each element are in the molecule
      1. Mono, Di, Tri, Tetra, Penta, Hexa, Hepta, Octa, Nona, Deca
      2. Example N2O5 = Dinitrogen Pentaoxide
   2. Do not use a prefix if there is only one of the first name
      1. Example CO = Carbon Monoxide
3. Formula Rules
   1. Use the name to figure out the formula
   2. Example Dicarbon Tetrabromide = C2Br4

**Take Unit 12 Test Part Three on a separate piece of paper**

**Part 4 – Binary Acids**

1. What to know
   1. Binary Acids are covalently bonded combinations of Hydrogen with another nonmetal
2. Naming Rules
   1. They all have the form Hydro\_\_\_\_\_ic Acid
   2. Fill in the blank with the base of the name of the element that is bonded with the Hydrogen
      1. Example
         1. Hydrogen and Nitrogen would be Hydronitric Acid
         2. Hydrogen and Chlorine would be Hydro­chloric Acid
3. Formula Rules
   1. Look up the charges on the periodic table and criss cross
      1. Example
         1. Hydrogen = H+1
         2. Nitrogen = N-3
         3. Answer = H3N
   2. How to Criss-Cross - The charge of one tells you how many of the other one you will have
      1. Examples
         1. Cross Aluminum (Al+3) with Oxygen (O­­-2) =Al2O3
         2. Cross Beryllium (Be+2) with Oxygen (O­­-2) = BeO
      2. Cross Aluminum (Al+3) with Permanganate (MnO­4-1) = Al(MnO4)3
   3. Subscripts and Superscripts – Subscripts tell you how many of something you have, Superscripts tell you what the charge of something is.
      1. Example NH4+1
         1. Has 1 Nitrogen and 4 Hydrogens
         2. Has a charge of +1

**Part 5 - Oxyacids**

1. What to know
   1. Binary Acids are covalently bonded combinations of Hydrogen with a polyatomic ion containing Oxygen.
2. Naming Rules
   1. Oxyacids are named similar to the polyatomic ion they have, but the ending is changed
      1. “ate” changes to “ic”
      2. “ite” changes to “ous”
   2. Examples
      1. Nitrate = Nitric Acid
      2. Nitrite = Nitrous Acid
3. Formula Rules
   1. Doing the same as above, but backwards will give you the polyatomic ion
   2. Then look it up on the chart
   3. Criss Cross with Hydrogen
   4. Example
      1. Nitric Acid
         1. “ic” = “ate,” so Nitric = Nitrate
         2. Nitrate = NO3-1
         3. Hydrogen = H+1
         4. Answer = HNO­3
      2. Nitrous Acid
         1. “ous” = “ite,” so Nitrous = Nitrite
         2. Nitrate = NO2-1
         3. Hydrogen = H+1
         4. Answer = HNO2

Part 6 – Binary Acids v Oxyacids

1. Telling the difference
   1. Binary Acids look like Hydro\_\_\_\_ic Acid
   2. Oxyacids look like Nitric Acid or Nitrous Acid
   3. Binary Acid formulas look like H­3N
      1. They have two elements
   4. Oxyacid formulas look like HNO2 
      1. They have more than two elements and one is Oxygen

**Take Unit 12 Test Part Four on a separate piece of paper**